

Georgia Department of Transportation

Construction Engineering Inspection Training

Construction Erosion Control Inspection—Group 2



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Section 160: Reclamation of Material Pits and Waste Areas

Vegetative requirements apply when Contractor obtains material from source or wastes material on area outside of right-of-way.

General

Reclamation area applies to areas outside of right-of-way

- Plant slopes above water only
- The Engineer may determine areas composed of rock or other materials not satisfactory for permanent vegetative cover



Submittals

- The Engineer must:
 - Approve planting type if the Contractor furnishes a material pit or waste area that requires vegetation
 - Approve all modified mixtures before planting begins



- Property owner may change plant material types specified in the plans to a type not shown in the Planting Table (Section 160.2)

Materials

- The Engineer will select the material type from the Planting Table
- The state is divided into planting zones shown on the Planting Zones Map (Section 700)
- Do not use giant Bermuda seed (Cynodon species), including NK-37
- Do not use Italian rye grass seed (perennial or annual)
- Apply entire combination of seeds specified for each group
- Increase seed quantities 50% on slopes too steep for soil preparation (cannot be dug 6 in. [150 mm] minimum depth)
- Air dry *sericea lespedeza* seed hay and ensure it contains mature seed
- Consult the Planting Table (Section 160.2)

Sample Planting Table (Section 160.2)

	Planting Groups	Species	Rates per Acre/Hectare	Planting Zones			
				Zone 1	Zone 2	Zone 3	Zone 4
Spring Planting	A	Weeping Love Grass	4 (4.5)	3/1-7/15	2/15-7/ 15	2/15-7/ 15	2/1-7/ 15
		Interstate Lespedeza (HS)*	50 (56)	3/1-7/15	2/15-7/ 15	2/15-7/ 15	2/1-7/ 15
	A-1	Interstate Lespedeza (HS)*	60 (67)	3/1-7/15	2/15-7/ 15	2/15-7/ 15	2/1-7/ 15
	B	Tall Fescue	30 (33.5)	3/1-5/1	2/15-5/1		
		Interstate Lespedeza (HS)*	50 (56)	3/1-5/1	2/15-5/1		

Preparation

- Seed or sprig areas subject to erosion
- Grass and mulch areas that require pine seedlings before planting the seedlings

Construction

Item	Construction Note
Ground Preparation	<ul style="list-style-type: none"> • The Engineer determines areas unsatisfactory for permanent vegetation • Plow areas to be planted to 6 in. (150 mm) depth
Lime and Fertilizer	<ul style="list-style-type: none"> • Spread agricultural lime uniformly at the rate shown on the plans or determined by the Engineer • Apply fertilizer grade 4-12-12, 6-12-12, or 5-10-15 uniformly at approximately 1200 lb/acre (1350 kg/ha) • Mix in top 2 in. (50 mm) of soil including areas to be planted with pine seedlings • Hydroseed slopes steeper than 2:1
Mulch	<ul style="list-style-type: none"> • Apply to all seeded and sprigged areas



Plant Pine Seedlings	<ul style="list-style-type: none"> • Use dibble or other approved planter to dig holes for pine seedlings after seeding or sprigging and mulching • Set plants slightly deeper than they were planted in nursery • Compact bottom of hole before setting plants (for hand planting)
Nitrogen	<ul style="list-style-type: none"> • Do not apply directly over seedlings
Harvest Sprigs	<ul style="list-style-type: none"> • Use sod cutter, turning plow, or other approved equipment so at least 3 in. (75 mm) of root system is lifted intact • Immediately load harvested sprigs and cover with wet burlap or canvas • Plant within 48 hours after harvested • Never allow sprigs to dry out or freeze
Apply Sprigs	<ul style="list-style-type: none"> • Use broadcast or row method • Do not perform broadcast on steep slopes or narrow areas
Broadcast Sprigging	<ul style="list-style-type: none"> • Apply mechanically or by hand in uniform layer over prepared surface placing 4 viable sprigs (minimum) to each ft² (43 viable sprigs to each m²) • Place 2–3 in. (50–75 mm) deep by disc harrowing or other means
Row Sprigging	<ul style="list-style-type: none"> • Open furrow spaced at least 1 ft (300 mm) apart and at least 4 in. (100 mm) deep • Immediately place in furrows by hand or machine and overlap in furrows • Do not expose sprigs to 15 minutes (maximum) to outside air before filling furrows



Pine Tree Seedlings

- Considered satisfactory after 85% of growth has survived 90 days after planting with no fail spots exceeding 0.25 acre (0.1 ha)
- Survival rate less than 85% but greater than 75% with fail spots less than 0.25 acre (0.1 ha) are measured for half payment at Contractor price unless deficient area is replanted
- Survival area less than 75% are replanted in full at Contractor's expense

Payment

- Seeding, sprigging, and pine seedlings are paid per acre (ha) at the Contract Unit Price

Related Specifications

Section	Title
700	Grassing
702	Vine, Shrub, and Tree Planting
890	Seed and Sod

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Section 162: Erosion Control Check Dams

Materials

- Use commercial type of woven wire (minimum 14½ gauge)
- Place #57 stone at location and depth marked on plans

Check Dam Construction

- Construct check dams before roadway clearing, grubbing, or grading is complete
- Remove trees, logs, brush, etc., within the right-of-way
- Do not disturb other natural ground cover
- Obtain embankment material for earth dams
- Place a layer of #57 stone on the downstream side of dam
- Grass the remaining portions (top/upstream slopes) of earth dams
- Grass or stabilize with straw mulch the roadway cut and fill slopes that drain toward the check dam drainage area
- Leave check dams in place after construction is complete (unless directed otherwise by the Engineer)



Stevenson Intermountain Seed

Use only rubber-tired equipment to work in affected drainage area until after check dam is completed



Contractor Warranty and Maintenance

- Repair check dams as needed during the Contract life
- Construct additional check dams if necessary and when directed by the Engineer

Measurement

- The number of erosion control check dams measured for the payment is the actual number completed and accepted

Payment

- Erosion control check dams are paid by the Contract Unit Price

Temporary devices will be left in place at Engineer's discretion without a change cost

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Section 163: Miscellaneous Erosion Control Items

Definition

Retrofit Device: A temporary sediment filter placed in front of an existing or proposed detention pond being used as a temporary sediment basin during the construction of the Project

Materials

- Provide materials shown on plans, including spillways, wood baffles, anti-collar, and other accessories
- Materials are the Contractor's property after removal
- The Engineer approves previously used materials



Construction

- *Silt Control Gates:* If silt control gates required or are directed by the Engineer, follow these guidelines to construct them:
 - Clear and grade only roadway portion within affected drainage area
 - Construct drainage structure and backfill
 - Install silt control gate at inlet of structure
 - Vary gate height as required as or shown on plans
 - Finish grading roadway in affected drainage area
 - Grass and mulch slopes and ditches that are not paved
 - Construct ditch paving required in affected area
 - Keep gate in place until work is complete and erodible earth is stabilized
 - Remove silt gate assembly by sawing off wood posts flush with concrete apron
 - Leave concrete apron between gate and structure inlet in place

seep

are



- *Temporary Slope Drains:* Follow these guidelines:
 - Place temporary pipe slope drains with inlets and velocity dissipaters
 - Securely anchor inlet into slope to provide a watertight connection to earth berm
 - Ensure that all connections in pipes are leak proof
 - Place temporary slope drains as shown on Uniform Code System for Erosion and Sediment Control Sheet for temporary items or as directed by the Engineer
 - Keep slope drains in place until permanent grass has grown enough to control erosion
 - Remove slope drains and grass disturbed area with permanent grass
 - Temporary slope drains may remain in place to help establish permanent grass if approved by the Engineer



- *Sediment Basins:*
 - Construct the unit complete as shown, including: (1) grading, (2) drainage, (3) rip rap, (4) spillways, (5) anti-seep collar, (6) temporary mulching and grassing on external slopes,

(7) accessories to complete basin, (8) remove and dispose sediment basin (no longer needed), and (9) mulch and permanently grass disturbed area

- *Baled Straw Erosion Checks:*

- Construct baled straw erosion checks according to plan details
- Substitute temporary silt fence Type B with many other options permitted in the specifications



- *Other Temporary Structures:*

- Plans may show other temporary structures for erosion control with required materials and construction methods

- *Temporary Grass:*

- Use temporary grass such as rye grass, millet, or a cereal grass
- Use temporary grass in the following situations:
 - Control erosion where permanent grassing cannot be planted
 - Protect an area for longer than temporary mulch is expected to last (60 days)
 - Use Polyacrylamide (PAM) as stated and required in the specifications
- Plant temporary grass as follows:
 - Use seeds that conform to Subsection 890.2.01
 - Perform seeding, temporary grass, and lime according to Section 700
 - Prepare areas that require no further grading according to Subsection 700.3.05.A
 - Apply mixed grade fertilizer at 400 lb/acre (450 kg/ha) (Omit Nitrogen)



- *Temporary Mulch:*
 - Apply temporary mulch to control erosion for 60 days or less
 - Use temporary mulch on erodible areas on or off right-of-way as follows:
 - Plant temporary grass on areas stabilized only with temporary mulch
 - Mulch area again after 60 days (mulching and temporary grass required if a period of 60 days has elapsed)
 - Uniformly spread mulch over designated areas 2–4 in. (50–100 mm) thick
 - Walk in mulch by using a tracked vehicle, empty sheepsfoot roller, light disking, or other ways
 - Place temporary mulch on slopes as steep as 2:1 by using a tracked vehicle to imbed mulch into slope
 - Leave mulch in place and plow mulch in soil during seed bed preparation; mulch will become beneficial plant food for newly planted grass
 - Place mulch to protect newly planted grass



- *Miscellaneous Erosion Control Not Shown on Plans:*
 - The Engineer may direct the Contractor to construct temporary devices such as but not limited to: (1) bulkheads, (2) wooden ditch checks, (3) sump holes, (4) half round pipe for use as ditch liners, or (5) UV-resistant plastic sheets to cover cut slopes
 - The Engineer and the Contractor will determine placement to ensure erosion control
- *Diversion Channels:*
 - Construct a diversion channel when building a culvert or other drainage structure in live stream requires diverting a stream
 - Protect the bottom and sides of a channel with plastic sheeting, rip rap, geotextile fabric, or other materials approved by the Engineer



- *Temporary Ditch Checks:*

- Construct and place temporary ditch checks according to plan details
- Allow construction of stone plain rip rap
- Place plastic filter fabric on the ditch section before placing rip rap
- Allow the temporary ditch check to remain in place until a permanent ditch protection is in place or being installed
- Allow the temporary one to remain in place to aid in establishing permanent grass in vegetated waterways (if approved by the Engineer)

Temporary ditch shall be cleaned of sediment when half of the height of the ditch is reached (special provisions may direct otherwise)

- *Inlet Sediment Trap:*

- Inlet sediment traps consist of a temporary device placed around a storm drain inlet to trap sediment
- An excavated area adjacent to the sediment trap provides additional sediment storage

- Traps are constructed of Type C silt fence, plastic frame and filter, hay bales, baffle box, or other filtering materials approved by the Engineer
- Construct inlet sediment traps according to appropriate specification for the material selected for the trap

Payment

- Temporary slope drains are paid by the linear foot (m)
- Temporary grass is paid by the acre
- Temporary mulch is paid by the ton
- Baled straw erosion checks, silt control gates, sediment basins, temporary ditch checks, construction exits, retrofit, and inlet sediment trap are paid by the Contractor Unit Price per each

Related Specifications

Section	Title
109	Measurement and Payment
161	Control of Soil Erosion and Sedimentation
171	Silt Fence
500	Concrete Structures
603	Rip Rap
700	Grassing
715	Bituminous Treated Roving
822	Emulsified Asphalt
860	Lumber and Timber
863	Preservative Treatment of Timber Products
890	Seed and Sod
893	Miscellaneous Planting Materials
	AASHTO M252
	AASHTO M294

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Section 165: Maintenance of Temporary Erosion and Sedimentation Control Devices

General

- Clean sediment from all temporary erosion control devices (except sediment basins) installed on Project (when half capacity of height, depth, or volume is reached)

Clean sediment from temporary sediment basins when
 $\frac{1}{3}$ capacity of storage volume is filled

- Handle sediment excavated from erosion of sediment control device by these steps:
 - Remove sediment from immediate area and immediately stabilize
 - Place and mix in roadway embankment, or waste as approved by the Engineer
 - Repair/replace at no cost to the Department any erosion or sediment control devices not functioning properly



Item	Maintenance Notes During Construction
Temporary Silt Fence	<ul style="list-style-type: none">• Includes furnishing labor, tools, materials, equipment, and necessary incidentals• Remove and dispose accumulated sediment down to original ground line
Silt Control Gates	<ul style="list-style-type: none">• Includes furnishing labor, tools, materials, equipment, and necessary incidentals• Remove and dispose accumulated sediment down to original ground line
Check Dams	<ul style="list-style-type: none">• Remove material deposited in sump holes

	<ul style="list-style-type: none"> Remove sediment accumulations on fabric by tapping fabric on downstream side or from baled straw by similar means
Temporary Sediment Basins	<ul style="list-style-type: none"> Remove sediment from rock filter and restoring rock filter to original specified condition and restore other components to pre-maintenance conditions
Sediment Barrier	<ul style="list-style-type: none"> Remove material deposited in sump holes Remove sediment accumulations on fabric by tapping fabric on downstream side or from baled straw by similar means
Retrofit	<ul style="list-style-type: none"> Remove and properly dispose of accumulated sediment in a permanent detention pond being utilized as a temporary sediment basin Maintain the stone filter by cleaning or replacing
Construction Exit	<ul style="list-style-type: none"> Includes additional stone and geotextile fabric to prevent tracking or flow of soil onto public roadways Includes scarifying existing stone, cleaning existing stone, or placement of additional stone Clean by scraping and/or brooming
Inlet Sediment Trap	<ul style="list-style-type: none"> Includes maintenance required to remove sediment accumulations (filtercake) from material selected to construct inlet sediment trap

Payment

- Temporary silt fence paid by Contractor Unit Price bid per linear ft (m) (Type A, B, or C)
- Sediment barrier, triangular silt barrier, check dams, and silt retention barrier paid by Contractor Unit Price bid per linear ft (m)
- Silt control gates paid by Contractor Unit Price bid per each (Type I, II, III, or IV)
- Temporary sediment basin, retrofit, construction exit, inlet sediment trap, rock filter dams, and stone filter berms paid by Contractor Unit Price bid per each

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Section 166: Restoration or Alteration of Lakes and Ponds

Contractor has responsibility for altering or restoring a lake or pond and adjoining property

Definition

Lake: This term indicates lake or pond regardless of its size or shape

Construction

- Use lake or pond area as a settling basin to contain silt, debris, or other foreign matter during construction
- Only use lakes denoted in the plans in lake restoration
- The Engineer will establish condition of lake and dam and determine existing contours of lake



Restoration of Lakes and Dams

- Remove silt often to avoid polluting downstream area
- Excavate and clean the lake of foreign matter
- Return the lake to its original contour and condition or the proposed contour
- Dispose of material removed in a manner satisfactory to the Engineer
- Grade and grass disturbed areas not under water
- Continue monthly inspections until Notice of Termination (NOT) is submitted

Alteration of Lakes or Ponds

- Work shall include activities to change physical size, shape, or depth of lake
- *Measurement:* Alteration or restoration of a lake is measured by unit
- *Payment:* Contractor Unit Price bid per each or on pro-rata basis of bid amount as work progresses



Restoration of a Lake

Payment

- Ten percent of bid amount paid each time lake or pond is cleaned of silt and debris during the construction period, up to four occurrences
- Remaining amount paid when final cleaning and restoration are complete and accepted

Related Specifications

Section	Title
107	Legal Regulations and Responsibility to the Public

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Section 167: Water Quality Monitoring

Certified Personnel

- Persons who have successfully completed the appropriate certification course approved by the Georgia Soil and Water Conservation Commission (WECS Certification Course)
- Persons who perform all monitoring, sampling, inspections, and rainfall data collection

General

- Perform inspections, rainfall data collection, sample testing, and reporting results according to requirements in Part IV of the Natural Pollutant Discharge Elimination System (NPDES) Infrastructure permit
- Take samples manually or with automatic samplers, according to permit
- Analyze all according to permit, regardless of the method used to collect samples
- Ensure monitoring results state values of pollutant discharge and are provided through a digital readout of measurements
- Submit bench sheets, work sheets, etc., when using portable turbidimeters
- Perform required inspections and submit required reports within the specified timeframe

Inspections

- The Department will provide one copy of the required inspection forms for use and duplication.
 - Inspection forms may change during the Contract
- The Engineer shall inspect the installation and condition of each erosion control device required by the erosion control plan within 7 days after initial installation
- Perform inspection for each stage of construction when new devices are installed
- Document all inspections on the appropriate form provided by the Department, as follows:



Frequency	Inspection
Daily	<ul style="list-style-type: none">• Petroleum product storage, usage and handling areas• All locations where vehicles enter/exit site
Weekly and after Rainfall Events	<ul style="list-style-type: none">• Rainfall event: 0.5 in. (13 mm) or greater• Inspect disturbed areas not permanently stabilized, material storage areas, structural control measures, and other water quality monitoring locations and equipment• Use EC-1 Form for Best Management Practices (BMP) inspections

Monthly	<ul style="list-style-type: none"> • Inspect areas where final stabilization has been completed • Look for evidence of sediments or pollutants entering the drainage system or receiving waters • Inspect permanent erosion control devices that remain in place
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Inspection Reports

- Summarize results of inspections on the appropriate Daily, Weekly, Monthly, or EC-1 form provided by the Department
- Reports should include:
 - Date(s) of inspection
 - Name of personnel performing inspection
 - Status of devices
 - Observations
 - Action taken
 - Signature of personnel performing inspection
 - Any incidents of noncompliance
- Submit all inspection reports to the Engineer within 24 hours
- The Engineer will review submitted reports and inspect the Project to determine their accuracy
- Correct any items listed in the report requiring routine maintenance within 72 hours of notification



Monitoring Reports

- Submit results to the Engineer within 7 working days of sample date
- Include:
 - Sample date
 - Rainfall amount
 - NTU of sample and analysis method
 - Sample location
 - Water or outfall sample
 - Project number and county
 - Automatic sampler or manually obtained
- Provide monitoring results to the Engineer within 48 hours of analyzing sample

If no qualifying rainfall event occurs prior to submittal of Notice of Termination,
submit a report with no samples

Rainfall Data Reports

- Record measurement of rainfall once each 24-hour period
- Measure at the active phase of the construction site
- Rain gauges and those used to trigger automatic samples are emptied after every rainfall event
- Rainfall data supplied by WECS to the Engineer is the official Project rainfall data



Related Specifications

Title

NPDES Infrastructure Permit No. GAR 1000002, Part IV GDOT WECS Seminar
Environmental Protection Divisions Rules and Regulations (Chapter 391-3-26)
Georgia Soil and Water Conservation Commission Certification Level IA Course

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Section 170: Silt Retention Barrier

Materials

- Use suitable permeable or impermeable materials
 - Canvas duck, clear or black polyethylene film, or fabric that meets requirements of Type C, temporary silt fence (Section 171)
- Alternate solutions and materials may be used if the Engineer approves
- Use barriers long enough and wide enough to control turbidity

Construction (Floating)

- Confine dredged materials to ponding areas or settlement basins using standpipes or weirs
- Place the barrier approximately 25 ft (7.5 m) outside the affected construction area, and depth within 5 ft (1.5 m) of the bottom
- Place the barrier parallel to the water flow
- Ensure the fabric is permeable
- Vary dimensions and methods to suit conditions and to ensure that silt dispersion is effectively controlled



Construction (Staked)

- Stake or float barriers depending upon current, tides, water depth, and other variables
- Ensure that the fabric:
 - Extends to the bottom of the stream and is weighted
 - Is permeable and not trenched at the bottom
 - Extends 1 ft above normal water from the top of fabric
- Place barrier close to the construction area in smaller streams



Payment

- The Contract Unit Price is paid for each barrier per linear ft (m)

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Section 171: Silt Fence



Delivery, Storage, and Handling

- Wrap the fabric in heavy-duty covering that protects cloth from sunlight, dirt, and debris
- Do not expose the fabric to temperatures greater than 140°F
- The Engineer rejects fabric if it has defects, rips, holes, flaws, deterioration, or damage incurred during manufacture, transportation, or storage

Excavated Trench Method

- Excavate 4–6 in. (100–150 mm) deep using a trenching machine or motor grader
- Excavate the trench by hand if equipment cannot be operated on site



Soil Slicing Method

- Create a mechanical slice in the soil 8–12 in. (200–300 mm) deep
- Ensure the width of slice is not less than 3 in. (75 mm)
- Mechanically insert the silt fence fabric into the slice in a simultaneous operation

The following items refer to excavated and soil sliced methods:

- Install the first post at the center of the low point
- Space remaining posts a maximum of 6 ft (1.8 m) apart for Types A and B fence and 4 ft (1.2 m) apart for Type C fence
- Bury posts at least 18 in. (450 mm) into the ground
- Secure the posts enough to prevent the fence from overturning from sediment loading if depth cannot be attained
- Evenly space staples or nails with at least five per post for Type A fence and four per post for Type B fence
- Attach fabric to a wood post using at least one additional staple or nail, or to a steel post using wire when pocketed fabric is used
- Allow use of a removed silt fence at other locations if the Engineer approves



Quality Acceptance

- Approved silt fence listed in QPL 36
- The Engineer will reject fabric with defects, rips, holes, flaws, deterioration, or damage incurred during manufacture, transportation, or storage

Contractor Warranty and Maintenance

- Maintain the silt fence until the Project is accepted or until the fence is removed
- Remove and dispose of silt accumulations at the silt fence
- Repair or replace any undermined silt fence at no additional cost to the Department

Payment

- Silt fence is paid at the Contract Unit Price bid per linear ft (m)

Related Specifications

Section	Title
700	Grassing
862	Wood Posts and Bracing
881	Fabrics
894	Fencing
	ASTM D 3786
	ASTM D 4355
	ASTM D 4632
	ASTM D 4751

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